

# IDEAL

November, 1983

## Concord C.140-330 Series 4

# Installation & Servicing

### G.C. Appliance Nos.

Concord C.140	41 407 83	Concord C.260	41 407 87
Concord C.170	41 407 84	Concord C.290	41 407 88
Concord C.200	41 407 85	Concord C.330	41 407 89
Concord C.230	41 407 86		

### CONTENTS:

	Page
Table 1 – Gas Data	2
Table 2 – Boiler Data	3
General Description	4
Site Requirements	5
Installing the Boiler	6
Maintenance	10
Commissioning and Initial Lighting	12
Fault Finding	13
Short Parts List	15
Assembly Instructions for Site Assembled Boilers	16

**STELRAD**  
**GROUP**

of the assembly rods. Liberally lubricate the threads and screw up the nuts equally in turn until the sections are fully engaged.

When the connector section is correctly in position, release the setscrews, remove the collars and washers and withdraw the assembly rods sufficiently to permit placing nipples and the next section (middle section) in position. After the nipples have been correctly entered in the nipple ports, (see Fig. 12) apply the 'Mastic' supplied to the beading grooves in the face of the connector section as shown in Fig. 13. The first middle section can then be manoeuvred into position, being suitably supported, until it engages the nipples projecting from the connector section.

Replace the assembly rods, relocate nuts on the long threads and reset the collars and washers one notch further along. Draw the sections together as previously described.

Repeat the assembling process for the remaining middle sections, ensuring that the 'Mastic' supplied is applied to the beading grooves in the front face of each section after assembly.

Finally, fit the front section, following the same assembly procedure.

After the pulling up process is completed all surplus sealing 'Mastic' must be removed from the combustion chamber. This must be done before firing the boiler.

On completion of the assembly of the boiler body, the two notched assembly rods and collars and washers should be removed and the four boiler tie rods fitted. These tie rods pass through the large holes in the assembly lugs located on the top shoulders and inside the feet of the front and rear sections. (See Fig. 2).

Fit a flat steel washer, a shakeproof washer and a nut on the threaded ends of the tie rods at the rear of the boiler.

Fit a cup washer, a flat steel washer, a shakeproof washer and a nut on the threaded ends of the tie rods at the front of the boiler. Screw up all the nuts equally in turn until all are secure, but do not overtighten and distort cup washer. At this stage, if one or both of the side return tapplings on the connector section are not required, the 2in. BSP sq. hd. plugs should be made watertight. The 2½in. x ½in. bush should be screwed into the top tapping on the face of the front section, followed by the fitting of the thermostat pocket to the tapping in the bush. The 2½in. x ½in. eccentric bush is fitted into the bottom tapping on the front section and the drain cock fitted into the bush. All connections should be made watertight using an approved jointing compound.

### FITTING COLLECTOR HOOD

Apply the 'Mastic' supplied to the front and rear seating edges of the collector hood before fitting on top of the boiler body. (Glass fibre sealing rope is affixed to the side seating edges at works prior to despatch).

Place the hood in position on top of the boiler body assembly and secure with the four Hex. Hd. bolts provided. These bolts pass through the small holes in the top tie rod fixing lugs and screw into the nutserts fitted in the ends of the collector hood.

### FITTING MAIN BURNERS(See Fig. 15)

Attach the burners to the rear support by means of M5 Hex nuts. The burners should then be slotted through the front plate and then attached using the M5 x 6mm pozi head screws.

### FITTING REAR PLATE ASSEMBLY

Insert the six M8 x 32mm lg. all-thread studs and M8 steel nuts into the tapplings on the back section (see Fig. 15). The two lower centre tapplings are not used. A washer should be fitted to the bottom side stud fixings. Care

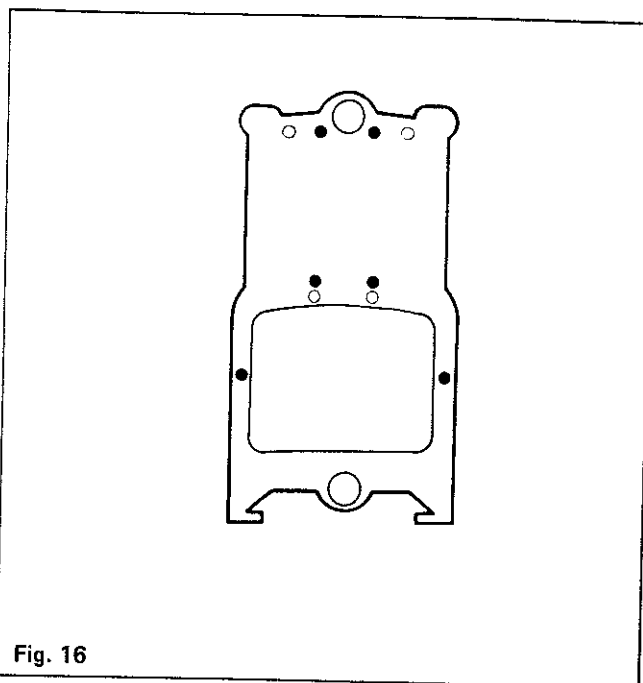


Fig. 16

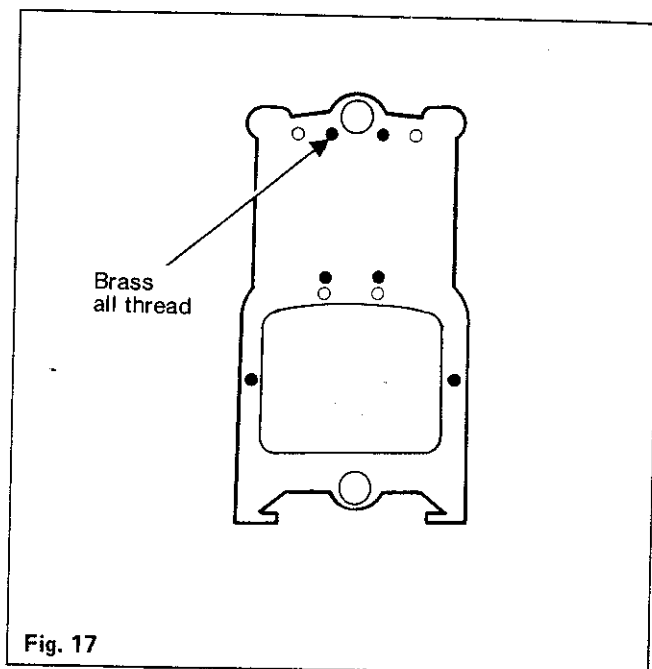


Fig. 17

should be taken to ensure that the studs are level. The rear plate assembly can now be fitted and tightly secured to the back section with M8 Hex. nuts (brass) and washers.

### FITTING FRONT PLATE/MANIFOLD/BURNER ASSEMBLY

Fit the six studs, fixings etc. into the front section as shown in Fig. 16. The front plate/manifold assembly should now be fitted tightly on the six studs, the washer and brass nuts securing the front cover to the boiler body. (Note that seven nuts are provided, the extra nut should be screwed onto the brass all-thread. This is used later for making an earth connection when fitting the control box to the boiler).

The boiler is now ready for the following:—

- Flue Connection
- Gas Connection
- Water Connection
- Casing Assembly

Full instructions for making the above connections are as detailed in the standard Installation Instructions.

TABLE 1

Boiler Size No. of Sections		C.140 4	C.170 5	C.200 5	C.230 6	C.260 7	C.290 8	C.330 10
Input	kW	52.6	62.1	75.5	87.3	97.3	111.1	125.2
	Btu/h x 1000	179.5	211.5	257.6	297.9	332.1	379.2	427.2
Rated Output	kW	41.0	48.4	58.6	67.4	76.2	86.5	96.7
	Btu/h x 1000	140	165	200	230	260	295	330
Gas Rate *	m <sup>3</sup> /h	4.9	5.8	7.0	8.1	9.0	10.4	11.6
	ft <sup>3</sup> /h	173	202	247	286	319	368	411
Approx. flue Gas Volume + in Primary Flue	8.2% CO <sub>2</sub>							
	246°C dm <sup>3</sup> /s	34	40	49	57	63	73	81
	8.2% CO <sub>2</sub> 475°F ft <sup>3</sup> /m	72	85	104	121	134	154	172
Approx. Flue Gas Volume + in Secondary Flue	3.8% CO <sub>2</sub>							
	132°C dm <sup>3</sup> /s	54	63	77	89	100	115	128
	3.8% CO <sub>2</sub> 270°F ft <sup>3</sup> /m	115	134	164	189	211	244	272
Main Burner Injector Size	mm	3.4	3.6	4.0	4.4	4.7	5.0	5.2
Manifold Pressure NATURAL GAS ONLY	mbar	12.8	13.5	13.3	12.8	12.2	12.0	12.2
	in.w.g.	5.1	5.4	5.3	5.1	4.9	4.8	4.9

\* The gas rates quoted for NATURAL GAS ONLY and assume a C.V. of 1040 Btu/ft<sup>3</sup>. The gas rate at calorific values differing from that figure may be calculated by dividing the calorific value of the gas into the figure, given in the 'INPUT' column above.

+ Primary flue volumes assume 8.2% CO<sub>2</sub> and 246°C (475°F) temperature.

Secondary flue volumes assume 3.8% CO<sub>2</sub> and 132°C (270°F) temperature.

**BOILER DATA**

**TABLE 2**

Boiler Size No. of Sections		C.140 4	C.170 5	C.200 5	C.230 6	C.260 7	C.290 8	C.330 10
Tappings Flow	Rc	←----- 1 x 2½ at rear -----→						
	in. BSP	←----- 1 x 2½ at rear -----→						
Return **	Rc	←----- 1 x 1½ at rear -----→		←----- 2 x 2 at sides -----→		←----- 2 x 2 at sides -----→		
	in. BSP	←----- 1 x 1½ at rear -----→		←----- 2 x 2 at sides -----→		←----- 2 x 2 at sides -----→		
Maximum Static Water Head	metres	←----- 36.5 -----→						
	feet	←----- 120 -----→						
Maximum Pressure	Bar	←----- 3.6 -----→						
	psi	←----- 50 -----→						
Gas Inlet Connection	Rc	←----- ¾ -----→		←----- 1 -----→		←----- 1 -----→		
	in. BSP	←----- ¾ -----→		←----- 1 -----→		←----- 1 -----→		
Minimum Dynamic Gas Pressure Required at Boiler Inlet for Rated Output	mbar (gauge)	14.5	15.5	15.5	15.7	15.0	17.0	17.5
	in.w.g.	5.8	6.2	6.2	6.3	6.0	6.8	7.0
Electricity Supply		←----- 200/250 volts, ~, single phase 50Hz. Fuse Value 5A -----→						
Nominal Flue Size	mm	←----- 150 -----→		←----- 200 -----→		←----- 200 -----→		
	in	←----- 6 -----→		←----- 8 -----→		←----- 8 -----→		
Diverter Outlet Socket Internal Diameter	mm	←----- 174 -----→		←----- 237 -----→		←----- 237 -----→		
	in	←----- 6 13/16 -----→		←----- 9 5/16 -----→		←----- 9 5/16 -----→		
Length of Burner Bars (overall including air-mix tube)	mm	425	←----- 521 -----→		617	713	785	977
	in	16¾	←----- 20½ -----→		24 9/32	28 1/16	30 29/32	38 15/32
Main Burner Injectors No.		←----- 3 -----→						
Combined Control and Limit Thermostat		←----- LANDIS/GYR RAZ 13/2716 or SATCHWELL TKD 3306 -----→						
Piezo Igniter		←----- VERNITRON No. 60038 (RH Outlet) -----→						
Spark Electrode		←----- BUCCLEUGH Eng. Ltd -----→						
Gas Control		←----- HONEYWELL ¼in. BSP I.C.G.C. V.4400 C1211 Softlite -----→						
Pilot Burner		←----- HONEYWELL Q314A (with BCR 18 injector) -----→						
Thermocouple		←----- HONEYWELL Q309A 2754 (36in) -----→						
Approximate Dry Weight	Kg	241	304	305	366	426	487	610
	lb	532	670	673	807	941	1074	1344
Water Content	litre	26.3	←----- 32.7 -----→		39.0	46.0	52.7	66.3
	gal	5.8	←----- 7.2 -----→		8.6	10.1	11.6	14.6

**Note:**

\*\* Side tappings MUST ONLY BE USED for gravity circulation.

HYDROLIC RESISTANCE  
LESS THAN 7.5 MBAR (3" W.G.)  
AT 11°C TEMP DIFF

# GENERAL DESCRIPTION

## IMPORTANT:

This appliance range is approved by the British Gas Corporation for safety and performance. It is, therefore, important that no external control devices – e.g. flue dampers, economisers, etc., – be directly connected to this appliance unless covered by these 'Installation and Servicing' instructions or otherwise recommended by Stelrad Group Ltd., in writing. If in doubt please enquire.

Any direct connection of a control device not approved by Stelrad Group Ltd., could invalidate the B.G.C. approval and the normal appliance warranty and could also infringe the Gas Safety Regulations.

Tables 1 and 2 and the descriptive notes which follow contain all the essential data likely to be required by the installer.

## CONSTRUCTION

**Boiler Body:** Cast iron sectional, supplied assembled. Loose sections and platework for site assembly can be supplied to special order.

**Insulation:** Foil backed, fibreglass blanket, with fixing straps.

**Casing:** Stove enamelled sheet steel, easily assembled at site.

**Diverter:** External, polished stainless steel.

## GAS CONTROLS

Control is by a slow opening combination gas control incorporating a thermocouple flame failure device and mains voltage gas valve. The connection box has a plug for mains input.

The combined boiler thermostat/limitstat is fitted to the boiler body.

## DUTY

The range of boilers is suitable for central heating and indirect hot water supply (gravity or pumped circulation) at static head up to 36.5 metres (120 feet). It is not suitable for direct hot water supply.

## WATER TREATMENT FOR HOT WATER AND HEATING BOILERS

There is a basic need to treat the water contained in all heating and indirect water systems, particularly open vented systems.

It is assumed incorrectly that because boilers are operating in conjunction with what is an apparently closed circuit, an open vented system will not under normal circumstances allow damage or loss of efficiency due to hardness salts and corrosion once the initial charge of water has been heated up a few times.

1mm of lime reduces the heat conversion from via metal to water by 10%.

In practice the deposition of these salts is liable to cause noises from the boiler body or even premature boiler failure. Corrosion and the formation of black iron oxide sludge will ultimately result in premature radiator failure.

Open vented systems are not completely sealed off from the atmosphere as it is essential to provide a tank open to atmosphere if proper venting and expansion of system water is to be achieved.

The same tank is used to fill the system with water and it is through the cold feed pipe that system water expands into the tank when the boiler passes heat into the system.

Conversely when the system cools water previously expanded is drawn back from the tank into the system together with a quantity of dissolved oxygen.

Even if leakage from the heating and hot water system is eliminated there will be evaporation losses from the surface of the tank which, depending upon ambient temperature, may be high enough to evaporate a large portion of the system water capacity over a full heating season.

There will always be corrosion within a heating or hot water system to a greater or lesser degree irrespective of water characteristics unless the initial fill water from the mains is treated. Even the water in closed systems will promote corrosion unless treated.

For the reasons stated above Stelrad Group strongly recommend that when necessary the system be thoroughly cleaned, prior to the use of a stable inhibitor, which does not require continual topping up to combat the effects of hardness salts and corrosion on the heat exchangers of the boiler and associated systems.

Stelrad Group advise contact directly with specialists on water treatment such as Fernox Manufacturing Co. Ltd., Britannica House, 214-224 High Street, Waltham Cross, Hertfordshire. EN8 7DU.

## GRAVITY CIRCULATION CONSIDERATIONS

All boilers in the Concord C series have a single 2½in. BSP flow tapping and consideration must be given by the heating engineer to any possible pump effect on the gravity circulation to a D.H.W. cylinder when a common flow is employed in a combined system. In such applications, it is strongly recommended that 2½in. BSP pipework, swept elbows and swept tees be used between the boiler flow tapping and the point where the common flow is divided.

This junction must be as near to the boiler as possible. Pipe sizes affecting water velocity at entry to the pumped heating circuit and gravity circulating head available should ensure that reverse circulation down the primary flow pipe to the D.H.W. cylinder does not take place when the heating pump is in operation. Stelrad Group Limited will attempt to advise on suitable alternative arrangements.

Should the initial evaluation of a proposed or existing combined gravity D.H.W. and Pumped heating system leave any doubt as to its efficient operation, it is recommended that a full pumped primary system be considered.

## MINIMUM FLOW OF WATER

The system design must provide for an adequate flow rate through the boiler at all times when the boiler is firing.

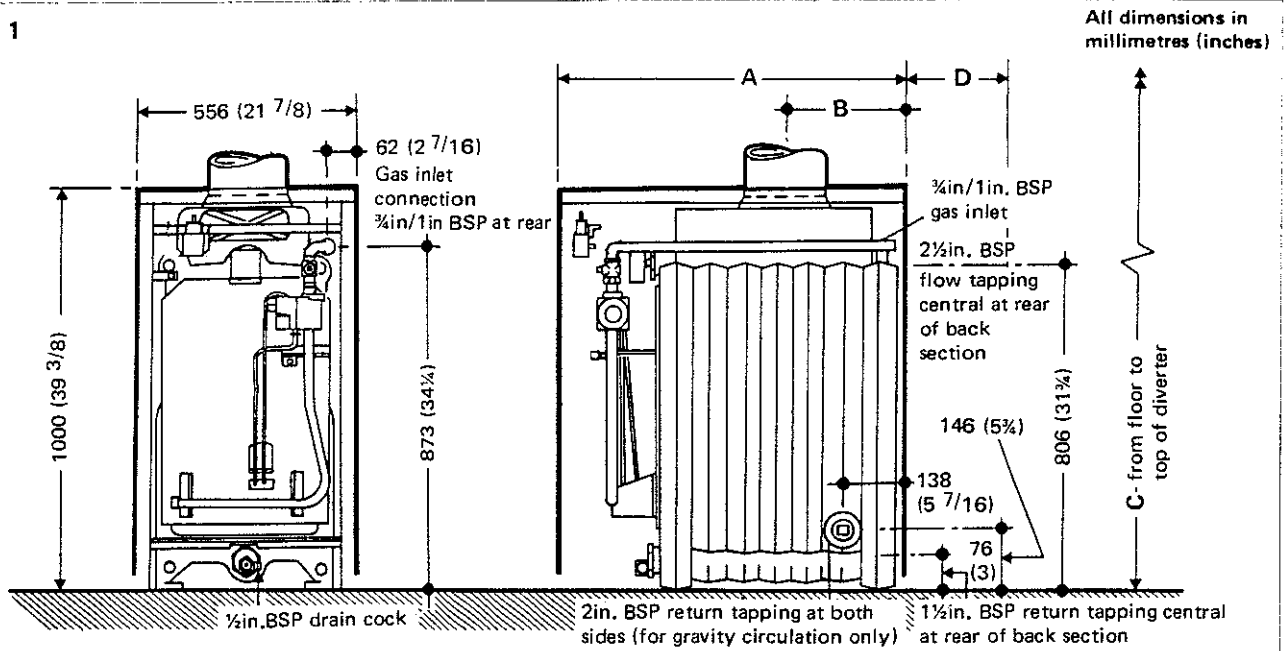
The minimum flow rate should correspond to a temperature difference across the boiler flow and return of 25°C (45°F) assessed at catalogue rating.

Boiler	Minimum flow rate for a temperature difference of 25°C (45°F)	
	l/s	g.p.m.
C. 140	0.39	5.2
C. 170	0.46	6.1
C. 200	0.56	7.4
C. 230	0.64	8.5
C. 260	0.73	9.6
C. 290	0.83	10.9
C. 330	0.92	12.2

## FLOW HEADER

An optional header is available, to provide connections for safety valve, gauge probes and vent pipe.

Fig. 1



Boiler Size		C.140	C.170	C.200	C.230	C.260	C.290	C.330	
		4	5	5	6	7	8	10	
A	mm	← 680 →		← 848 →		← 1130 →			
	in	← 26 3/4 →		← 33.3/8 →		← 44 1/2 →			
B	mm	← 203 →		← 293 →		← 383 →			
	in	← 8 →		← 11 1/2 →		← 15.1/16 →			
C	mm	← 1373 →		← 1550 →					
	in	← 54 →		← 61 →					
D Optional flow header	mm	← 450 →					← 17.3/4 →		
	in	← 17.3/4 →					← 17.3/4 →		

TABLE 3  
BOILER HOUSE CLEARANCES

Boiler Size		C.140	C.170	C.200	C.230	C.260	C.290	C.330
No. of Sections		4	5	5	6	7	8	10
At Front	mm	450	← 500 →		750	840	650	830
	in	17 3/4	← 19 3/4 →		29 1/2	33	25 1/2	32 3/4
At Rear		← Allow sufficient space for access and pipework →						
At Sides		← Can be zero, but space will be required for water connections when side returns are used →						

**DIMENSIONS**

Overall dimensions and the positions of the tappings, gas inlet connection and flue outlet are shown in Fig. 1.

**SITE REQUIREMENTS**

The installation should comply with relevant British Standard Specifications, Codes of Practice and current Building Regulations, together with any special regional requirements of the Local Authorities, Gas Region, and Insurance Company. All electrical wiring must comply with I.E.E. Regulations for the electrical equipment of buildings.

**INSTALLATION**

For safety use a competent installer to fit this appliance, e.g. CORGI (the Confederation for the Registration of Gas Installers) requires its members to work to satisfactory standards. They are identified by this symbol

The installation of the boiler must be in accordance with the relevant requirements of the Gas Safety Regulations, I.E.E. Regulations, Local Water Authority Byelaws. It should also be in accordance with any relevant

requirements of the local gas region, local authority and the relevant British Standard Codes of Practice, CP 331.3 Low pressure installation pipes, CP 332.3 Installation of Gas Fired Boilers, CP 341. 300-307 Central Heating by low pressure hot water. CP 341.1 and 2 Centralized hot water supply. British Gas publications. IM/11 Flues for commercial and industrial gas fired boilers and air heaters. Manufacturers notes must not be taken, in any way, as overriding statutory obligations.

**POSITION OF BOILER**

Minimum clearances required from walls or other fixed objects to allow for installation, maintenance, the free access of combustion air and correct functioning of the draught diverters are as shown in the table at the top of this page.

**FOUNDATION**

The floor must be flat and level and of a suitable load bearing capacity. The boiler has a water cooled base and insulation, other than that required by the local Authority

and Building Regulations, is not necessary. If the boiler is mounted on a plinth the dimensions must exceed the plan area of the boiler by at least 75mm on each side.

## VENTILATION

Safe, efficient and trouble-free operation of conventionally flued gas boilers is vitally dependent on the provision of an adequate supply of fresh air to the room in which the appliance is installed. Ventilation, by grilles communicating directly with the outside air, is required at both high and low levels. The minimum free areas of these grilles must be according to the following scale:—

Total input rating of boiler(s)	Position of air vent(s)	Air vent areas (Air direct from outside)
Up to 730 kW	High level	4.5cm <sup>2</sup> per kW (1in <sup>2</sup> per 5000 Btu/h)
Up to 2500,000	Low level	9cm <sup>2</sup> per kW (2in <sup>2</sup> per 5000 Btu/h)
730–1320 kW	High level	3300 cm <sup>2</sup> (500 in <sup>2</sup> )
2500,000– 4500,000 Btu/h	Low level	6600 cm <sup>2</sup> (1000 in <sup>2</sup> )

Site ventilation grilles to avoid the risk of accidental obstruction. If further guidance on ventilation is required consult CP.332 Part 3 and the British Gas Guidance notes.

## IMPORTANT

The use of an extractor fan in the same room as the boiler (or in an adjacent room in communication) can, in certain conditions, adversely affect the safe operation of the boiler. Where such a fan is already fitted (or if it is intended to fit an extractor fan after installation of the appliance) the advice of the Gas Region should be obtained. Tests for spillage of products from the draught diverter when the extractor fan is running and all doors and windows are shut should be carried out after installation. If spillage be detected, the area of permanent ventilation must be increased.

## SECONDARY FLUE

To ensure safe and satisfactory operation, the boiler must be connected to a secondary flue capable at all times of adequately evacuating the combustion products, the approximate volumes of which are given in Table 1. The flue design recommendations contained in CP.332 Part 3, should be strictly observed. The draught diverter supplied with the boiler must never be omitted.

## GAS

If there is any doubt regarding the capacity of the gas meter, the available gas pressure, the adequacy of existing service pipes or the size required for new service pipes, the advice of the Gas Region should be requested.

## ELECTRICITY

A 200/250V 50Hz AC mains supply is required. A 3-pin socket outlet, fused at 5amps, must be provided near to the boiler. If a switched outlet be used, the switch MUST be of the double-pole type. **D.C. current is not suitable.**

## WATER CONNECTIONS

The positions and sizes of the flow and return tappings provided are shown in Fig. 1. The return tappings on the sides of the boiler must only be used for the gravity returns of combined pumped and gravity systems; pumped circuits must never be connected to these tappings.

In order to give satisfactory temperature distribution, factory assembled boilers are despatched to site with the pumped rear return bushed down to Rc1½ (1¼in.BSP).

# INSTALLATION

## PACKAGING

Factory assembled boilers are despatched from works in three packages:—

1. Assembled boiler body on wooden pallet base.
2. Carton containing the casing, fastenings, flue brush, connection box, instruction book, insulation blanket and securing straps.
3. Carton containing the draught diverter.

Check that all these packages have been correctly received at the site.

## WARNING:

Never attempt to lift or move the boiler by the gas pipe-work or burner manifold as damage by straining will result. The burner and control line assembly must be removed before lifting the boiler from the wooden pallet base for installation. To remove the assembly, take off the nuts and washers on the six studs securing the front cover to the boiler body and slacken the nuts on the front gas pipe clamp. The assembly can then be slid forward from the boiler body and put to one side in a safe place, it should not be replaced until the boiler body has been taken off the wooden base and removed to its final installed position. Manoeuvre the boiler body into the chosen position (note the warning above before doing so). Remove the tie-bar nuts, already fitted in position for transportation, from the front end of each of the four tie-bars. A set of four cupped expansion washers are provided packed in a plastic bag.

Fit a cupped expansion washer, a flat steel washer, a shakeproof washer and a nut on the front end of each tie-bar. Screw up all nuts equally in turn until they are secure; do not over-tighten and distort the cup washers.

Replace the burner and control line assembly. Replace tightly on the six studs the washers and brass nuts securing the front cover to the boiler body, (note that seven nuts are provided; the extra nut should be screwed onto the upper left hand stud. This is used later for making an earth bonding connection when fitting the control box to the boiler), and tighten the front gas pipe clamp nuts.

## SECONDARY FLUE CONNECTION

Place the draught diverter centrally in position over the boiler flue outlet and complete the secondary flue connection. Seal with approved boiler putty between the boiler outlet socket and the diverter, and between the diverter outlet socket and the flue pipe to ensure gas-tight joints at these points.

## Note:

The maximum unsupported weight of the flue pipe should not exceed 45kg (100 lbs).

**THE DRAUGHT DIVERTER MUST NEVER BE OMITTED OR MODIFIED IN ANY WAY, IT MUST BE MOUNTED IN THE VERTICAL PLANE DIRECTLY ON TOP OF THE BOILER SMOKEHOOD OUTLET.**

## GAS CONNECTION

Connect the gas supply to the gas inlet pipe. The use of an approved union is recommended here.

## FLOW HEADER

If the optional flow header is supplied with the boiler, it should be fitted at this stage. Separate fitting instructions are included in the carton in which the header is supplied.

**Legend:**

1. Gas pipe clamp
2. Gas inlet connection
3. Rear cover
4. Inlet gas pressure test nipple
5. Gas pipe clamp
6. Union gas cock
7. Tie bar
8. Lighting door
9. Drain cock
10. Manifold gas pressure test nipple
11. Gas manifold
12. Pilot gas pipe
13. Thermocouple lead
14. Front cover
15. Gas control
16. Piezo igniter
17. Connection box
18. Boiler thermostat knob
19. Earth bond
20. Combined boiler thermostat/limitstat
21. Pocket for boiler thermostat and limitstat phials
22. Collector hood cleanout cover
23. Diverter

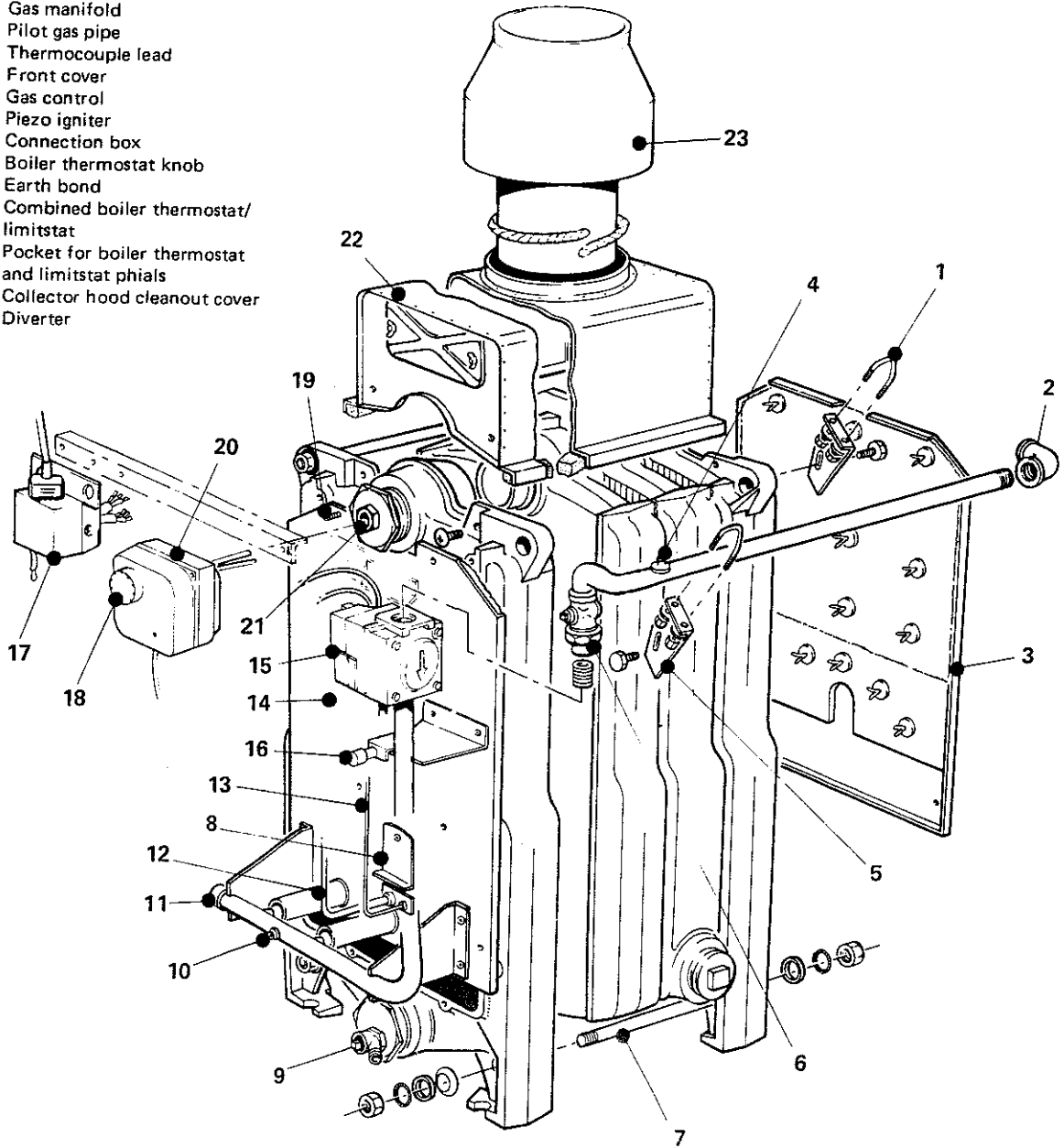


Fig. 2

CONCORD C 140 ILLUSTRATED

**COMPLETING WATER CONNECTIONS**

The flow and return connections to the rear tappings may conveniently be completed at this stage. Note however that connections to the side return tappings (which are for use only with the gravity circuit of combined pumped and gravity systems) cannot be made before the jacket has been fitted. Check that all tappings not used have been tightly plugged.

**INSULATION BLANKET (See Fig. 3)**

Place the glassfibre blanket around the boiler body, outside the upper tie rods and with the aluminium foil backing facing outwards. The back edge of the blanket should be

in line with the back edge of the boiler body. The loose ends of the blanket should hang equally down each side of the boiler. With the blanket in position, cut out the necessary hole for the flue outlet, using a sharp knife, so allowing the blanket to fit snugly around the flue outlet. The loose ends of the blanket should extend under each side of the boiler body, but inside the lower tie rods. A plastic strap with buckle is passed around the top of the boiler at each end, around the lower tie rods, and the ends of the strap taken back again to meet at the centre-top of the boiler body. The strap buckles are secured, so holding the insulation blanket firmly in place.

In certain cases, a larger size insulating blanket will be supplied than required. In these circumstances, the blanket should be trimmed to size to fit the boiler.



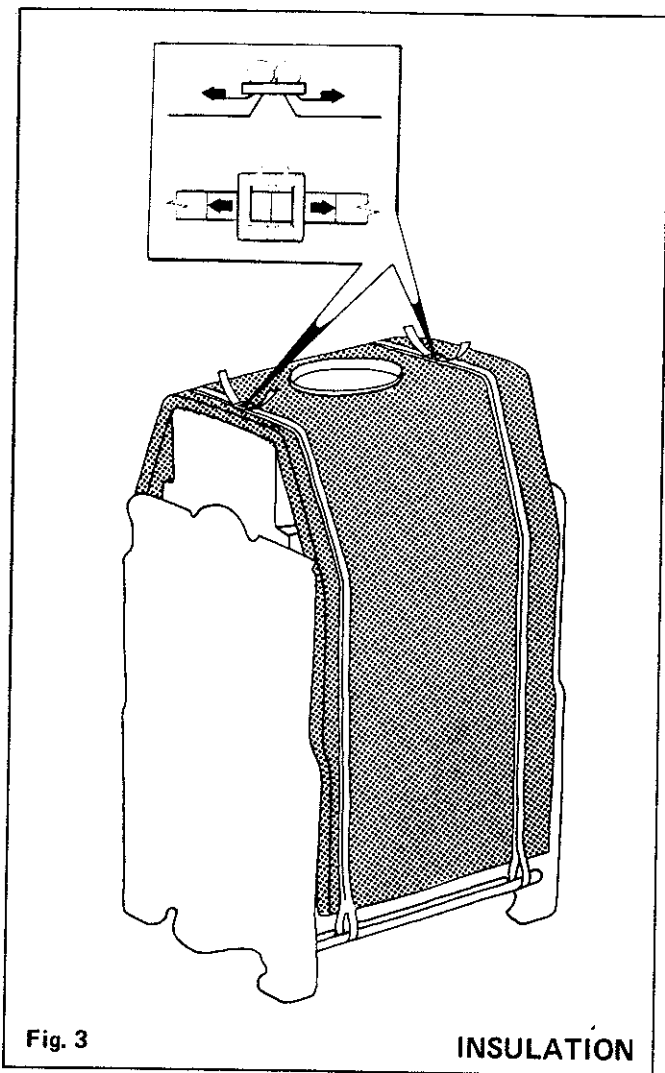


Fig. 3

INSULATION

#### CASING

The casing may now be fitted, the assembly method being clearly shown in Fig. 5. When using the side return tappings, the knockout opening in the appropriate side panel should be removed before assembly.

Note that three sizes of casing are used for the range of seven sizes of boiler. To achieve correct assembly, always align the rear of the casing side panels with the rear of the boiler body.

#### Casing Assembly (see Fig. 5)

1. Fasten the lower front (A) and rear (B) channels to the boiler body (M8 x 12 lg. hex head screws into tapped holes in front and rear boiler sections).
2. Fit front fixing bracket (C) (one only, positioned at the left hand side) and rear fixing brackets (D) (two, one at each side) to the boiler body. (M8 x 12 lg. hex head screws into tapped holes in front and rear boiler sections).
3. Fit the white nylon studs supplied in the jacket hardware pack, into the top return of the jacket side panels, by dropping them in from the top and securing with the nylon circlips from underneath.
4. Position the left hand side panel return behind the rear lower angle (B) and allow the aligned slot in the locating front bracket (E) to engage with the lug on the lower front channel (A). Fasten the panel with No. 10 x 10 long self-tapping screws to the rear fixing bracket (D) and rear angle (B).
5. Fit the spire clip supplied in the jacket hardware pack to the upper locating bracket (F), in the correct slot for the size of boiler.
6. Fasten front fixing bracket (C) to the upper locating bracket (F) with M5 x 10 lg. Pozi pan screw.

7. Similarly fit the right hand side panel. Note however that at this side there is no front fixing bracket and upper locating bracket.
8. Fit the connection box (J), upper support angle (G) to the brackets (H) on the side panels, using hex. head screws through the outer holes in support angle (G).
9. Fasten the connection box (J) to the support angle (G), using M5 x 8 pozi pan head screws.
10. Fit the front and rear top panels (held by nylon studs).
11. Fit the threaded studs supplied in the jacket hardware pack into the bottom corner of the jacket side panels, making sure the short threaded end is screwed into the panel.
12. Fit front panel (positioned on pins at the bottom and held vertical by magnetic catches at the top).

#### ELECTRICAL CONNECTIONS

The internal wiring of the boiler control box is shown in Fig. 6.

Systems controls must be wired externally into the live mains lead to the boiler. If a frost thermostat be fitted it should, of course, be wired across the time switch contacts and if frost is likely the system should be turned off using the time switch settings, all other controls must be left in the normal running position.

Any clock control used should be of the four terminal type, giving a separate supply for the clock motor. Both the supply to the clock motor and the boiler must be controlled by a single isolating switch.

**THE EARTH CONNECTION MUST NEVER BE OMITTED.**

All wiring between entry at the rear of the boiler and the connection box must be secured neatly under the cable clips provided on the casing. Wiring must never be allowed to come in contact with the hot boiler body.

#### Earth Bonding

The connection box is provided with an earth bond. This earth bond must be fitted to the upper left hand stud on the front of the boiler body. Remove the extra brass nut on this stud, place the earth lead terminal over the stud and secure with the extra brass nut.

**THIS CONNECTION MUST NEVER BE OMITTED.**

The thermostat harness, prewired to the connection box, has appropriate connections for the control thermostat. (The limitstat is already wired up). Fit the spade terminals onto the two connector tags on the gas control, and the earth connection to the screwed terminal on the gas control. The gas control lead terminates with two push-on spade terminals and one ring terminal for the gas control.

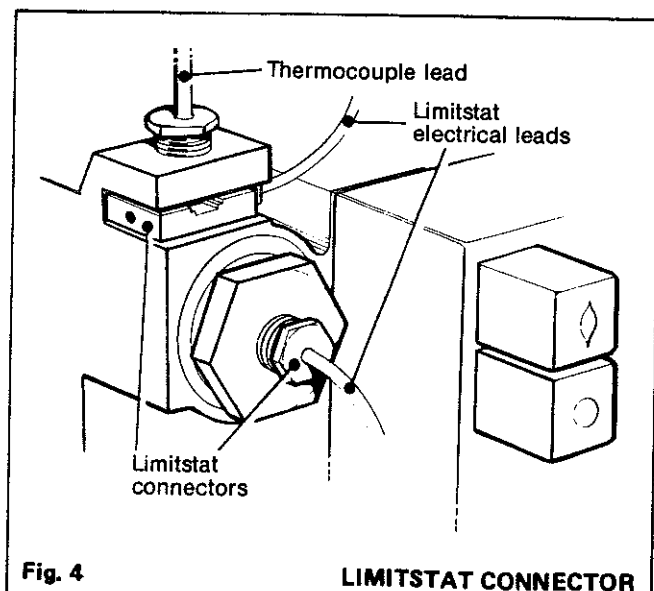
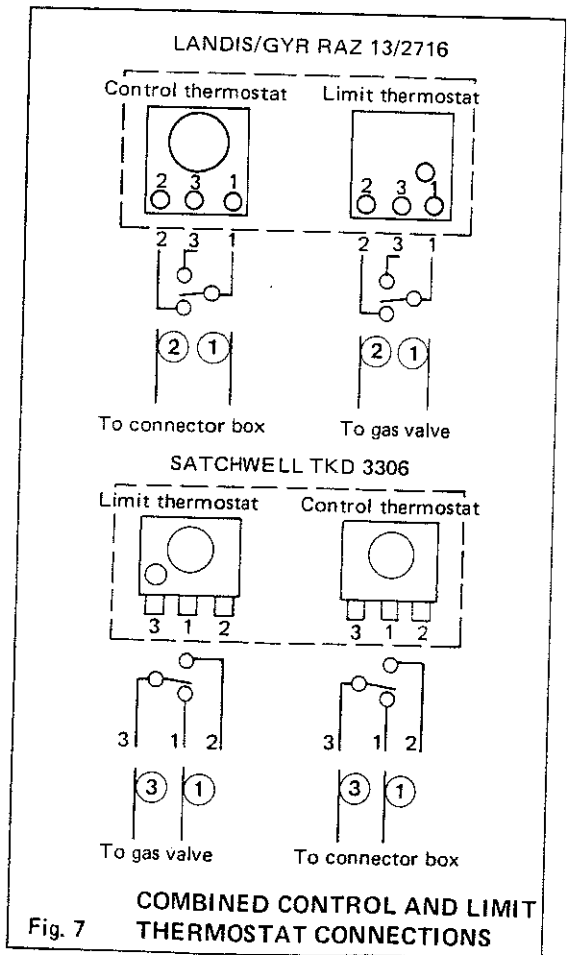
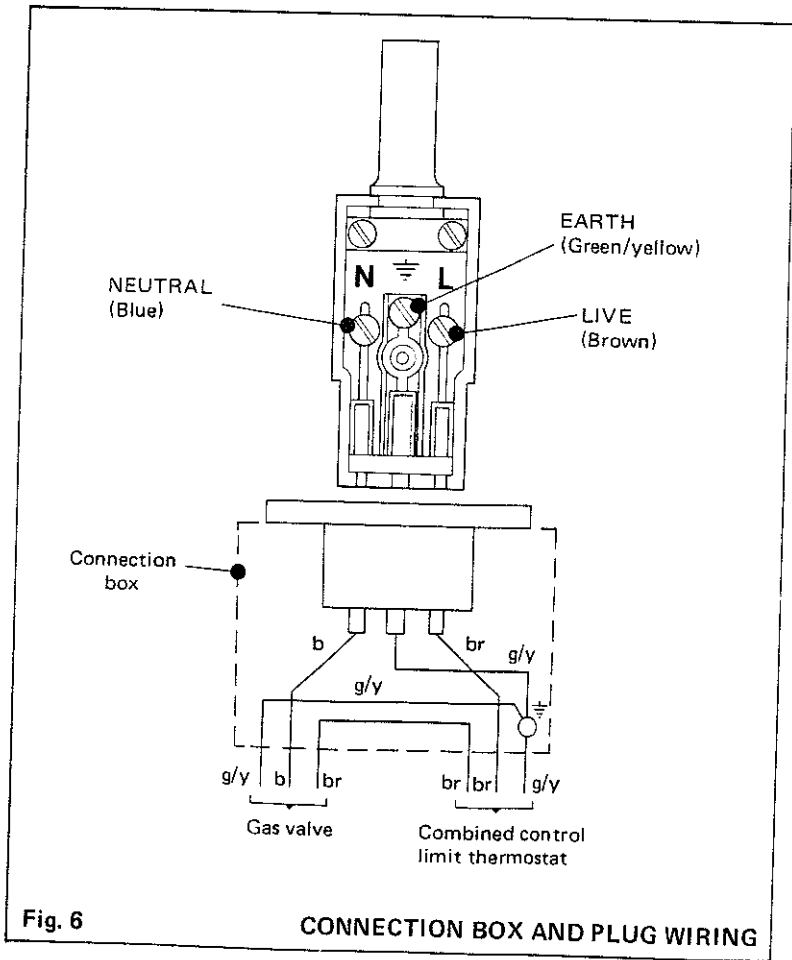
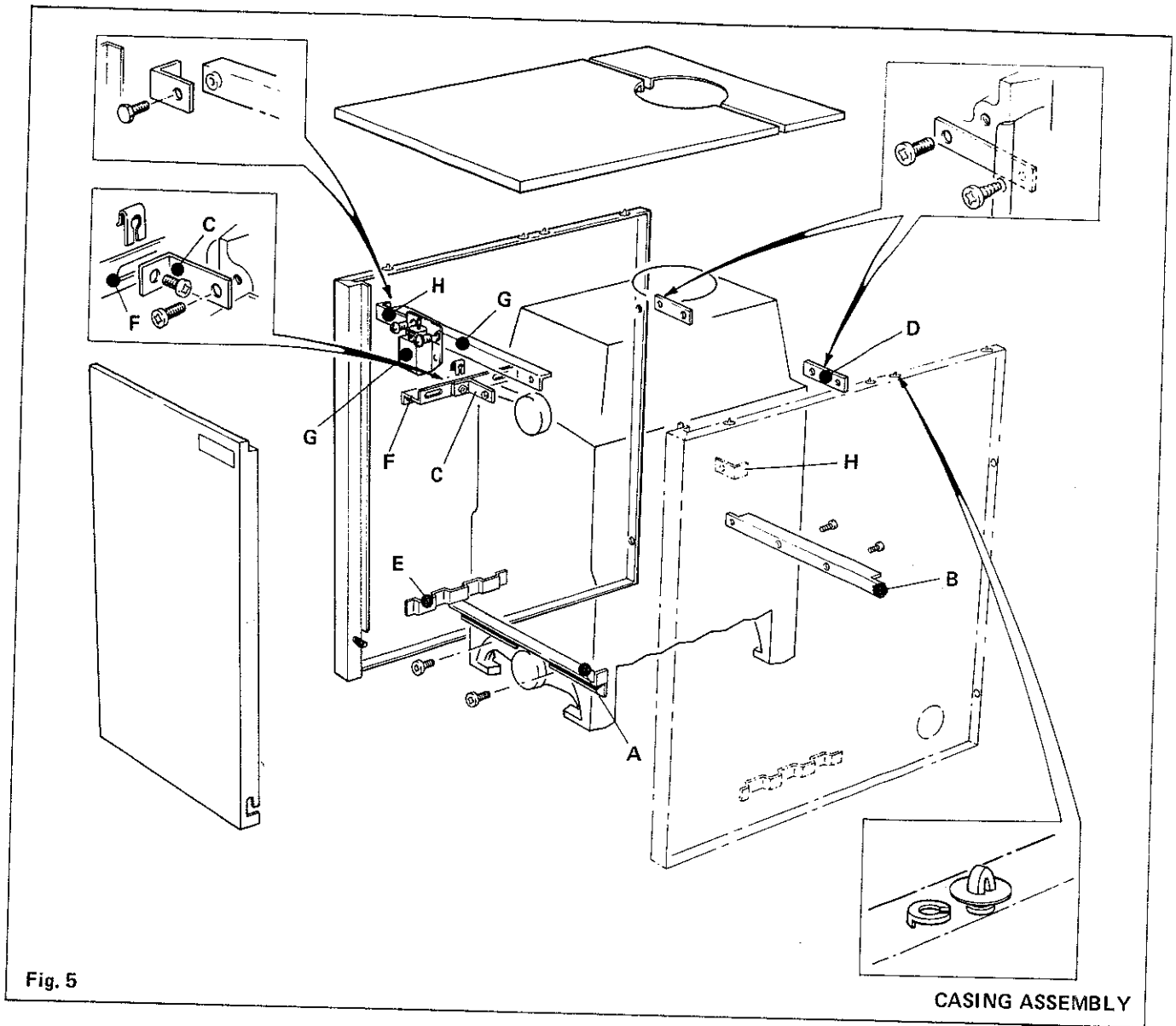


Fig. 4

LIMITSTAT CONNECTOR



# COMMISSIONING AND INITIAL LIGHTING

## General

Check that the system has been filled and properly vented, all drain cocks closed and that any stop valves fitted in the flow and return mains are open.

## Purging

Check that the electricity supply is switched OFF. Remove jacket front panel. Extinguish all naked lights and open all doors and windows. Do not smoke. Check that the gas supply is turned ON at the meter. Open the main gas inlet cock (C). Loosen the union nut on the cock outlet and carefully purge air from the pipework. Re-tighten the union nut when gas is smelled.

## TESTING FOR GAS TIGHTNESS

Close the gas supply cock at the meter. Remove the screw in the gas inlet pressure test nipple (4) (Fig. 9) and connect a gas pressure gauge to the test nipple. Take particular care to ensure a gas-tight connection. Open the gas supply cock at the meter and record the static pressure. Next close the gas supply cock at the meter and observe the pressure gauge over a period of one minute. Any pressure drop recorded over this period must not exceed 0.5 mbar (0.2 in. w.g.).

## Initial Lighting

**WARNING:** If the pilot light is extinguished either intentionally or unintentionally no attempt should be made to relight the gas until 3 minutes have elapsed.

1. Switch off the electricity supply to the boiler.
2. Press down and release the red button (E) marked O on the gas control (F).
3. Turn the control thermostat knob (A) anti-clockwise to its minimum setting (54°).
4. Ensure that the main gas cock (C) is open (groove in square head in line with the pipe).

5. Press the overheat thermostat button (B).
6. Open the lighting door (H).
7. Push in and retain fully depressed the white button (D) marked Q on the gas control (F) and at the same time repeatedly push in and release the Piezo generator knob (G) to produce a spark at the pilot burner. When the pilot has lit keep the button (D) on the gas valve fully pushed in for a further 20 seconds.
8. If the pilot burner does not remain alight when the button (D) is released, press and release the red button (E), wait for 3 minutes and then repeat from step 7.
9. If the pilot cannot be established, check that the pilot burner flame correctly envelops the thermocouple tip by 10–13mm (3/8"–1/2"). If not, adjust the pilot burner pressure as described below.
10. Check that the thermocouple lead connections at the gas control and at the boiler limit thermostat are clean and secure.
11. With the pilot flame established, close the lighting door (H) and ensure that all external system controls (time switch, room thermostat, etc.) are in the ON position.
12. Turn the control thermostat knob (A) to the required setting and switch on the electricity supply. The main burner will now light.
13. When the boiler has lit check all gas connections for tightness with soap solution.
14. Note that the gas control opens progressively. The first stage gives a low opening pressure which is progressively increased over a period of approximately 10 seconds to the full operating pressure.

**N.B.** If the piezo unit should not work for any reason, the boiler may be lit by means of a paper spill. Position a lighted spill near the pilot burner, push in the gas control knob and hold it depressed until the pilot burner lights; hold down the knob for a further 20 seconds, and effect the subsequent lighting.

## MANIFOLD GAS PRESSURE

The manifold gas pressure must now be checked and adjusted as necessary. Commence the adjustment procedure with the system cold, on full load and with all temperature controls set at maximum. This will ensure, as far as possible, that thermostatic shutdown does not interfere whilst the pressure is being checked and adjusted. Remove the screw in the manifold pressure test nipple (1) and securely connect a suitable gas pressure gauge. Light the boiler and allow it to operate for about fifteen minutes to stabilise the burners. Check the pressure and adjust it to the figure shown in Table 2 for the appropriate boiler size. The location on the gas control of the manifold gas pressure adjuster is shown in Fig. 9. Remove the dust cover over the adjuster and, using a small screwdriver, turn the screw beneath clockwise to increase or anti-clockwise to decrease pressure. The pressures quoted in Table 2 are given to facilitate speedy approximate adjustment of the gas rate. After setting to the pressure indicated allow the boiler to operate for about fifteen minutes to stabilise and then check the gas rate by reference to a watch and the gas meter. (Before doing so make certain that any other gas appliances connected to the same meter are turned off). The gas rate for each size of boiler is given in Table 1. A deviation of  $\pm 2\%$  of the quoted figure in the observed gas rate is of no practical importance but any greater variation must be adjusted by increasing or decreasing pressure as required by small steps until the correct rate is obtained. Replace the dust cover when finished, disconnect the gas

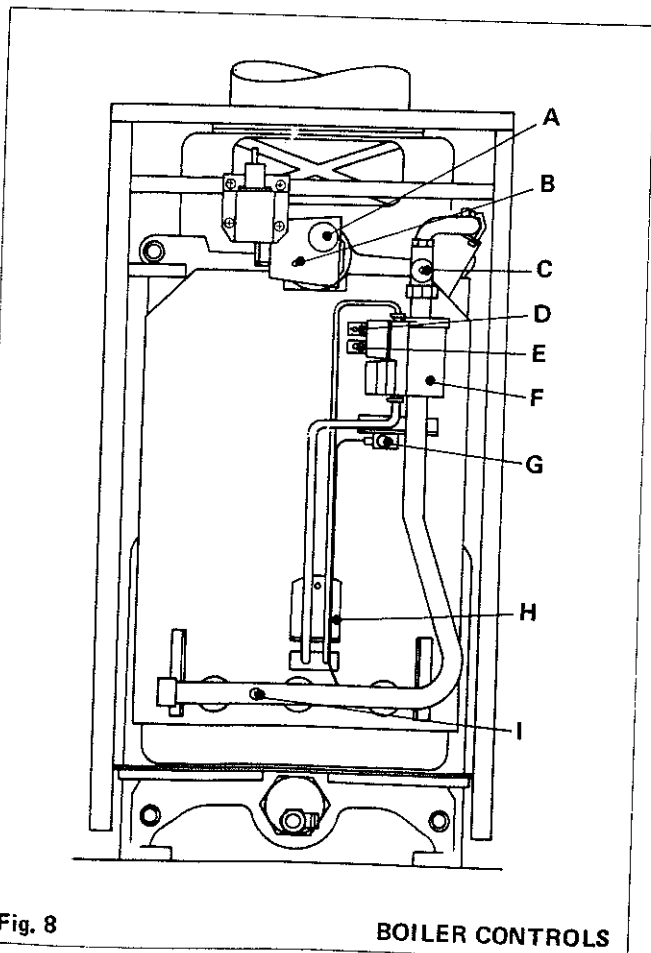
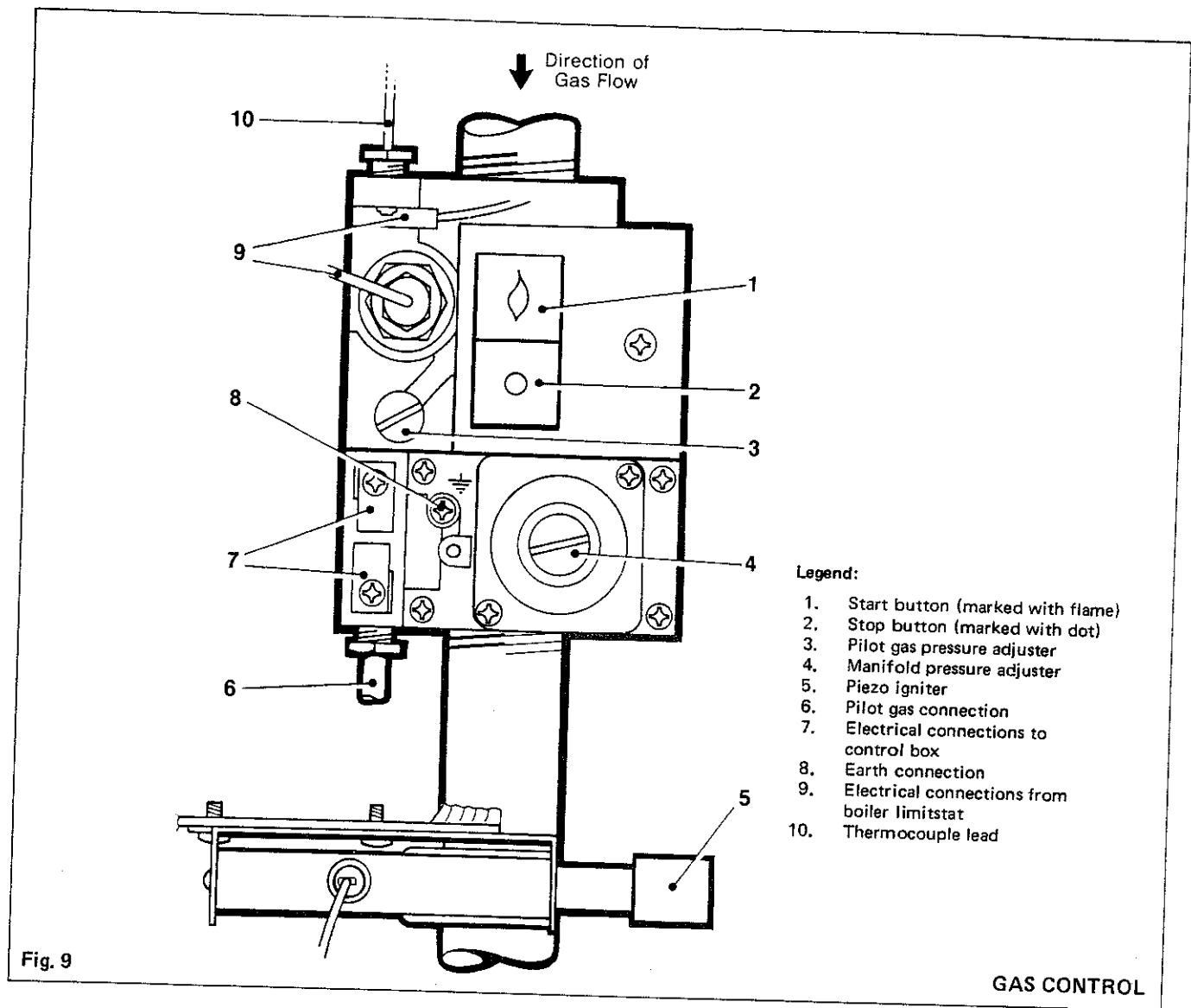


Fig. 8

BOILER CONTROLS



pressure gauge and replace the blanking-off screw in the manifold pressure test nipple.

### PILOT BURNER PRESSURE

The pilot burner flame should envelop the thermocouple head by 10–13mm (3/8–1/2in.). The position of the pilot burner pressure adjuster on the gas control is shown in Fig.9. Turn the adjustment screw beneath the dust cover clockwise to decrease or anti-clockwise to increase the flame length.

Replace the dust cover and fibre washer.

### TESTING

Check that the main burner responds correctly to the manual ON/OFF operations of the boiler control thermostat and any other controls fitted in the gas control circuit.

Check in the following manner the operation of the flame failure safety device:—

1. Extinguish the main burner and pilot burner by turning off the main gas inlet cock (Fig.8) (C).
2. Wait for 1½ minutes, during the course of which the thermocouple-operated solenoid valve in the gas control, which controls the main and pilot gas flow, will be heard to close.
3. Open the lighting door (Fig. 8) (H) and hold a lighted spill adjacent to the pilot burner and then open the main gas inlet cock. Neither the pilot burner nor the main burner should ignite.

### WARNING

The lighted spill must always be positioned at the pilot

burner **before** opening the gas inlet cock.

If this test cannot be satisfactorily made, the gas control is faulty, and should be examined and repaired or replaced by a competent engineer. The boiler must not be used until this has been done.

### ROUTINE OPERATION

Full instructions covering routine lighting and operation of the boiler are given on the Instruction Plate located on the inside of the casing door.

### HANDING OVER

Draw the attention of the boiler owner or his representative to the Lighting and Operating Instruction Plate on the inside of the jacket door. Give a practical demonstration of lighting and shutting down. Describe the function of the boiler and system controls and show how they are adjusted and used.

Hand over this booklet to the customer and request him to keep it in a safe place for ready reference.

### IMPORTANT

Point out to the owner that the boiler must have regular maintenance and cleaning at least annually to ensure reliable and efficient operation. Regular attention will also prolong the life of the boiler and should preferably be performed at the end of the heating season. Recommend that a contract for this work should be made with the Regional Gas Authority or a firm of Heating Engineers.

# MAINTENANCE

## WARNING:

Before working on the boiler always disconnect the electricity supply (remove plug from socket or switch off at a double-pole isolating switch) and shut off the main gas inlet cock.

## CLEANING THE BOILER

1. Disconnect the electricity supply and turn off the main gas inlet cock (see note above).
2. Remove the casing front panel by pulling forward from the top to release the spring stud fasteners and then lift off.
3. Lift off the casing top panels.
4. Release thermocouple lead and electrical connections at the gas control.
5. Unscrew the union nut beneath the main gas inlet cock.
6. Remove the hexagon nuts and washers securing the combustion chamber front panel. Note that the upper left-hand stud has two nuts, the upper nut securing a green/yellow earth bond lead. After removing the upper nut this bond can now be released. Slacken off the nuts on the front gas pipe clamp. The complete front plate/burner assembly is now free to be withdrawn from the combustion chamber. Put it to one side in a safe place. Similarly remove the combustion chamber cover at the rear of the boiler.
7. Remove the wing nuts securing the collector hood front and rear clean-out covers. Remove the covers.
8. Cover the floor of the combustion chamber with newspaper or strong brown paper to collect, and facilitate removal of, debris dislodged during cleaning.
9. Pass the flue brush through the collector hood clean-out cover opening(s) and thoroughly clean the interior of the hood, brushing dislodged debris through the flue openings between the boiler sections. Continue by using the brush from the front and rear of the boiler to thoroughly clean the boiler flueways. Next, using the brush from inside the combustion chamber, brush upwards between the sections. Finally brush down the walls of the combustion chamber. Perform all these operations with great care to ensure all deposits are completely removed.
10. Remove the paper with the dislodged deposits from the floor of the combustion chamber.
11. Examine the burner assembly. Clean the burner bars by brushing them down with a stiff bristle (**not wire**) brush. Check each bar carefully to ensure that all the flame ports are clear and that all surfaces are free from accumulated deposits. If available, an industrial vacuum cleaner may be useful to assist in this work. When cleaning the burner bars, take care to avoid damage, from rough handling, to the pilot burner and thermocouple assembly.
12. Examine the pilot burner and thermocouple. Clean them by wiping gently with a soft rag. Ensure that the flame ports and pilot injector are unobstructed. If the injector is damaged, a new injector should be fitted. If the thermocouple tip shows signs of deterioration (e.g. burning, splitting or cracking) a new thermocouple should be fitted. Check that all thermocouple lead connections are clean and tight. Do not tighten these connections more than one-quarter turn beyond finger-tight. If fitting a new

thermocouple do not kink the lead; any bends should have a minimum radius of 25mm (1in.). If refitting the pilot burner assembly ensure that the thermocouple is to the right hand side.

13. Check the spark electrode setting. (See Fig.10).
14. Examine the gas injectors (located in the gas manifold), and check that the orifices are unobstructed.
15. Brush out any dirt which may have accumulated on the floor beneath the boiler.
16. Re-assemble the boiler in reverse order.

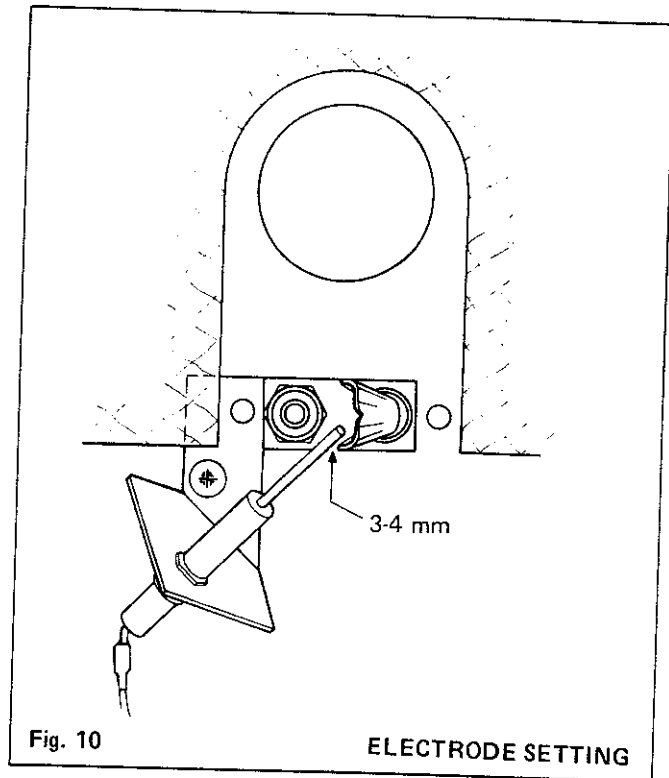


Fig. 10

ELECTRODE SETTING

## IMPORTANT

Ensure that the green/yellow earth bond from the connection box is correctly replaced under the second nut on the upper left-hand front cover studs and that the gas union nut is securely tightened.

## TESTING AFTER SERVICING

After re-assembly, restore the electricity and gas supplies. Light the boiler (see Lighting Instructions on inside of casing front panel) and check gas connections for tightness as detailed under 'Testing for Gas Tightness' on page 10. Check gas pressures and the gas rate and test as instructed on page 10 under headings 'Manifold Gas Pressure', 'Pilot Gas Pressure' and 'Testing'. Adjust time and temperature controls to the user's requirements and remember to reset any time control, which may have been switched off, to the correct time of day.

## REPLACING COMPONENTS

The boiler has been designed to facilitate the replacement of all components which may require renewal during the service life of the appliance.

## Gas Control

Follow instructions under 'Cleaning the Boiler', in preceding paragraphs 1-6. Undo the thermocouple lead and pilot pipe connections at the gas valve. The valve may now be unscrewed, re-assembly being in reverse order.

### Thermocouple

Undo the thermocouple connections and withdraw. Follow the instructions under 'Cleaning the Boiler', para 12 for re-assembly.

### Pilot Burner

Undo the pilot pipe and thermocouple connections and withdraw both the pipe and thermocouple. Unscrew the two pozidrive screws holding the burner to the front plate and withdraw the burner complete. Replace in reverse order ensuring that the pilot injector is in position and the thermocouple is to the right hand side.

### Combined Control and Limit Thermostat

Switch off the electricity supply and turn off the main gas

inlet cock. Remove the thermostat cover by releasing the four securing screws. Disconnect the cable connections to the control/limitstat and withdraw complete with cable glands. Loosen the screw in the thermostat pocket and withdraw the thermostat complete. **DO NOT LOSE THE SPRING SPACER CLIP.**

Fit the replacement control/limitstat in reverse order, referring to Fig. 6 for appropriate connections.

**N.B.** Ensure that the push-on connections on the limitstat are tightly made.

### Burners

Follow the instructions given under 'Cleaning the Boiler' (in preceding paras 1-6). The burners may now be unscrewed from the front plate. Re-assemble in reverse order.

## FAULT FINDING

Before attempting any electrical fault finding, ALWAYS carry out the preliminary electrical system checks as detailed on pages 6-9 of the Instructions for the British Gas Multimeter.

The preliminary electrical system checks are the FIRST electrical checks to be carried out during a fault finding procedure.

On completion of the service/fault finding task, which has required the breaking and remaking of electrical connections,

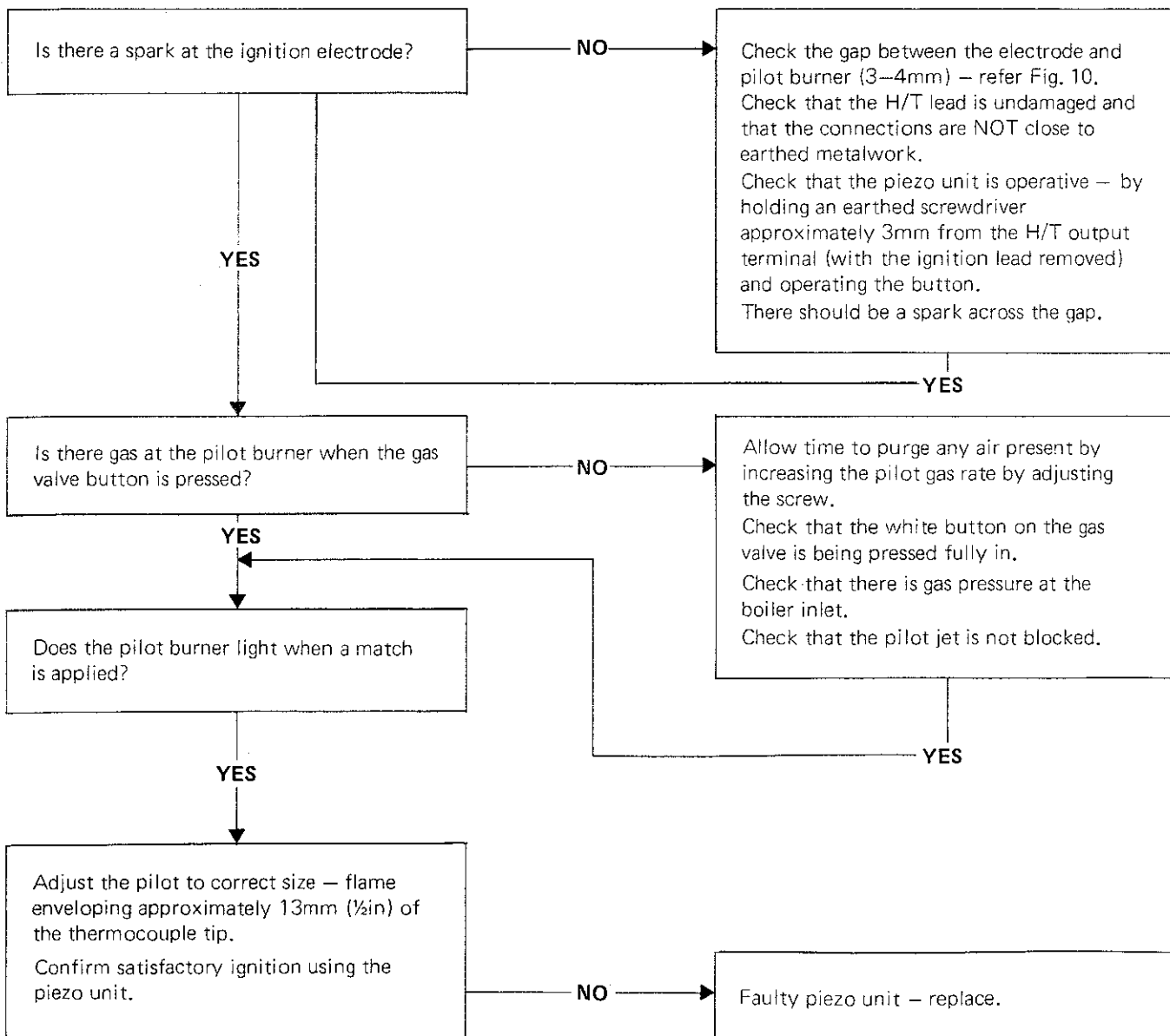
then the checks:

- (a) Earth Continuity.
- (b) Polarity, and
- (c) Resistance to Earth —

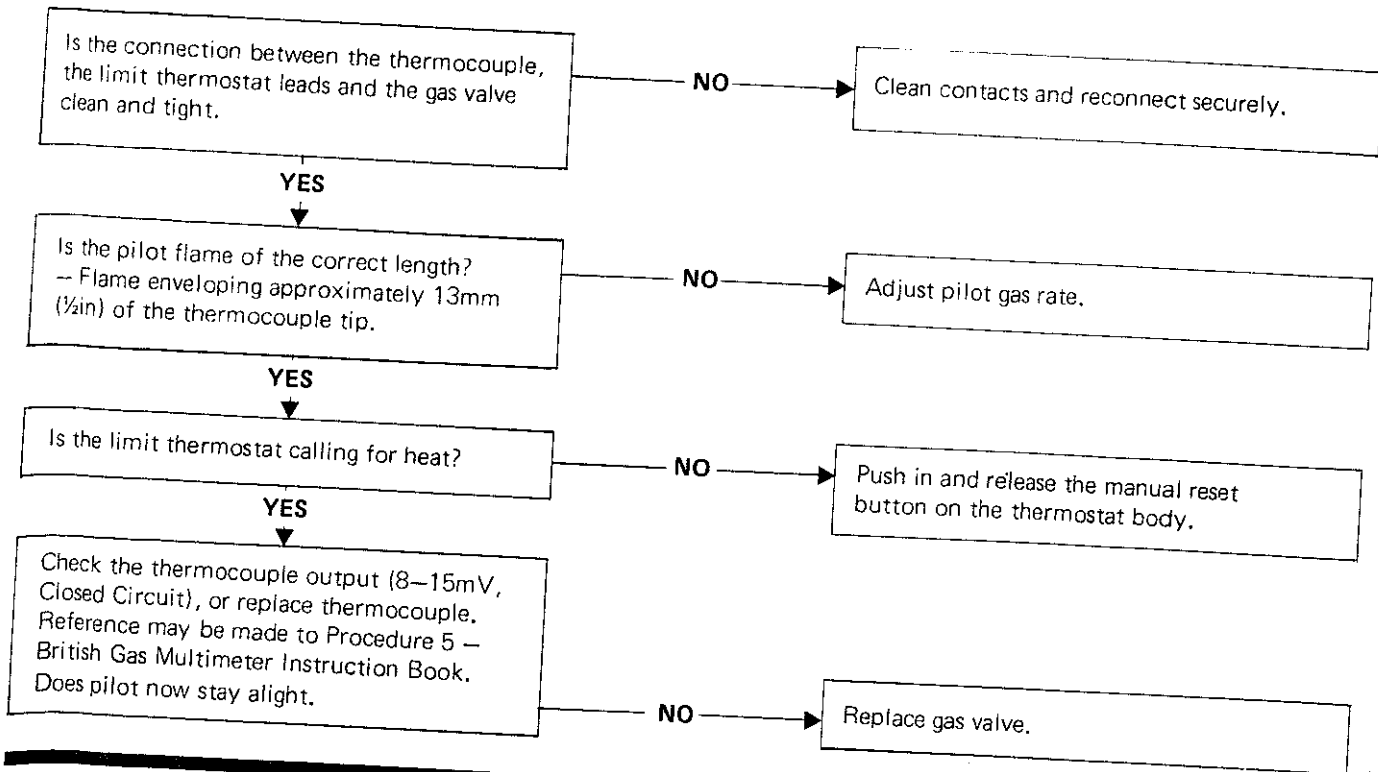
**MUST** be repeated.

DETAILED INSTRUCTIONS ON THE REPLACEMENT OF FAULTY COMPONENTS ARE CONTAINED IN THE SERVICING SECTION OF THIS PUBLICATION.

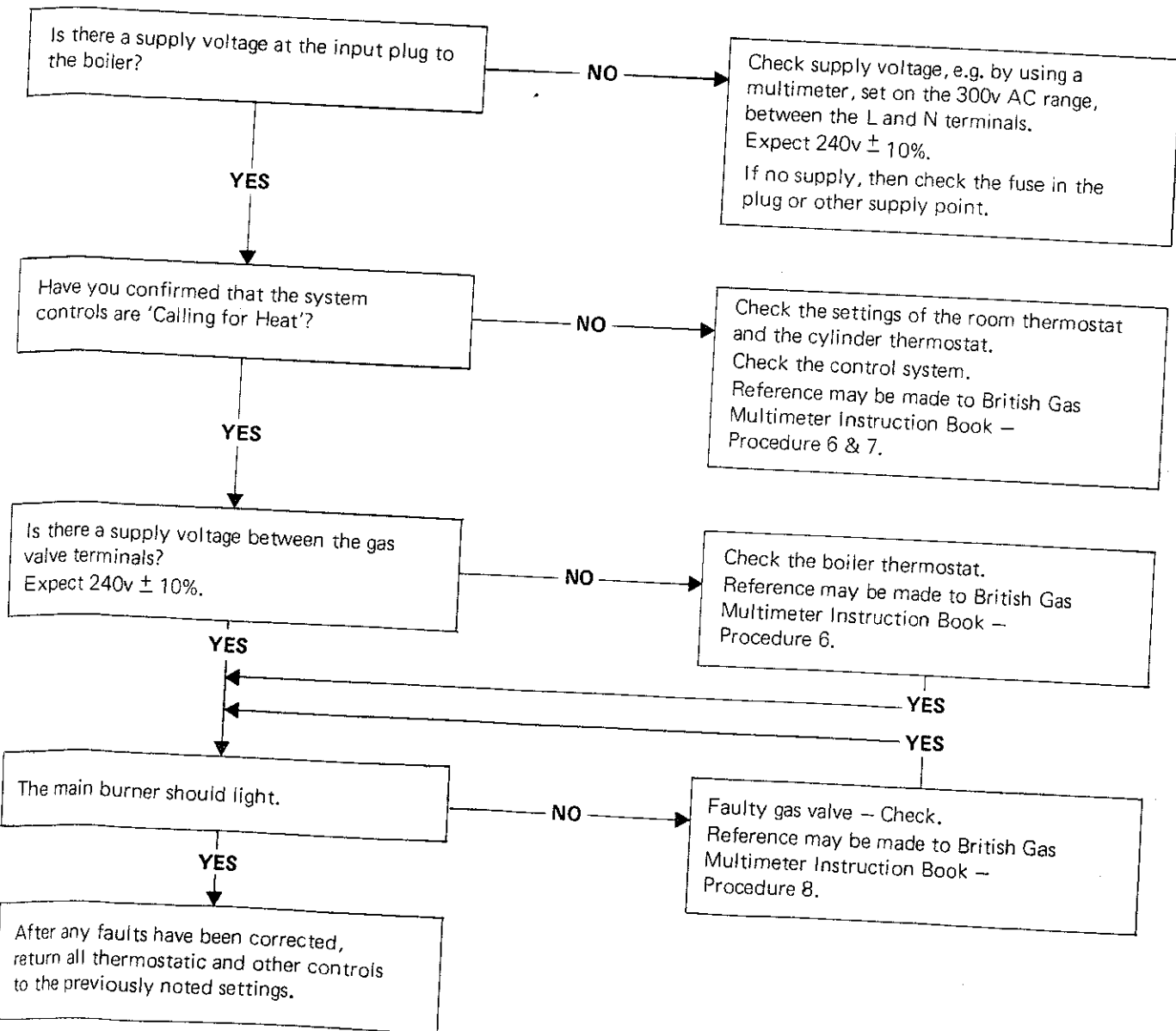
### PILOT WILL NOT LIGHT



**PILOT WILL NOT STAY LIT  
WHEN THE GAS VALVE BUTTON IS RELEASED**



**PILOT LIT, BUT NO MAINS GAS**



# SHORT LIST OF PARTS

The following list comprises parts commonly required as replacements due to damage, expendability, or such that their failure, or absence, is likely to affect safety or performance.

When ordering spares, please quote:

1. Boiler Model
2. Description
3. Maker's Part Number
4. Quantity

Item No.	Description	No. Off	Maker's Part No.
30	Burner bar 'Furigas' with 2-M5 x 6mm lg pozi pan screws and hex nuts (3 per blr) for C140 - 4 sects.		
31	Burner bar 'Furigas' with 2-M5 x 6mm lg pozi pan screws and hex nuts (3 per blr) for C170 - C200 - 5 sects.	3	139743540
32	Burner bar 'Furigas' with 2-M5 x 6mm lg pozi pan screws and hex nuts (3 per blr) for C230 - 6 sects.	3	139743541
33	Burner bar 'Furigas' with 2 M5 x 6mm lg pozi pan screws and hex nuts (3 per blr) for C260 - 7 sects.	3	139743542
34	Burner bar 'Furigas' with 2-M5 x 6mm lg pozi pan screws and hex nuts (3 per blr) for C290 - 8 sects.	3	139743543
35	Burner bar 'Furigas' with 2-M5 x 6mm lg pozi pan screws and hex nuts (3 per blr) for C330 - 10 sects	3	139743544
37	Injector 'Furigas' 3.4 dia (pack of 3) for C140 - 4 sect.	3	139743545
38	Injector 'Furigas' 3.6 dia (pack of 3) for C170 - 5 sect.	3	129004101
39	Injector 'Furigas' 4.0 dia (pack of 3) for C200 - 5 sect.	3	129004102
40	Injector 'Furigas' 4.4 dia (pack of 3) for C230 - 6 sect.	3	129004103
41	Injector 'Furigas' 4.7 dia (pack of 3) for C260 - 7 sect.	3	129004104
42	Injector 'Furigas' 4.9 dia (pack of 3) for C290 - 8 sect.	3	129004105
43	Injector 'Furigas' 5.2 dia (pack of 3) for C330 - 10 sect.	3	129004106
54	Pilot burner assembly - Honeywell Q314a 5039 with BCR 18 pilot injector	3	129004107
55	Pilot injector - BCR 18	1	586861609
56	Pilot burner gasket - Thermatex	1	169120177
57	Electrode with backnut - Buccleugh Eng Ltd	1	586751640
58	3/4" Softlite control valve - Honeywell V.4400 C1211	1	586751780
60	Thermocouple 36" lg - Honeywell Q309A. 2754	1	586752010
61	Spark generator - Vernitron No. 60038 (RH outlet)	1	581861906
62	Igniter lead - 620mm lg.	1	589040086
65	Thermostat - Landis & Gyr - RAZ 13-2716	1	586751790
66	Thermostat - Satchwell TKD.3306	1	586761513
67	Thermocouple interrupter lead assembly	1	586761511
68	Connection box assembly c/w plug and socket	1	586751710
69	Mains connector plug - ASHLEY or BULGIN to CEE 22 sheet 5 and BS.4491	1	586761251
73	RH. Jacket side panel - White Enam - for C140/C170/C200	1	589030015
74	RH. Jacket side panel - White Enam - for C230/C260	1	139745005
75	RH. Jacket side panel - White Enam - for C290/C330	1	139745007
76	LH. Jacket side panel - White Enam - for C140/C170/C200	1	139745007
77	LH. Jacket side panel - White Enam - for C230/C260	1	139745015
78	LH. Jacket side panel - White Enam - for C290/C330	1	139745016
79	Top panel Jacket - Front Half - White Enam - for C140/C170	1	139745017
80	Top panel Jacket - Front Half - White Enam - for C200	1	139755025
81	Top panel Jacket - Front Half - White Enam - for C230/C260	1	139755026
82	Top panel Jacket - Front Half - White Enam - for C290/C330	1	139755027
83	Top panel Jacket - Rear Half - White Enam - for C230/C260	1	139855028
84	Top panel Jacket - Rear Half - White Enam - for C290/C330	1	139755037
85	Jacket front panel with nameplate, instruction plate and magnetic catches white enamel	1	139755038
87	Jacket assembly - White Enam - for C140/C170	1	139765080
88	Jacket assembly - White Enam - for C200	1	139766140
89	Jacket assembly - White Enam - for C230/C260	1	139766200
90	Jacket assembly - White Enam - for C290/C330	1	139766230
		1	139766290



# ASSEMBLY INSTRUCTIONS FOR SITE ASSEMBLED BOILERS

## SITE ASSEMBLY PROCEDURE

### GENERAL

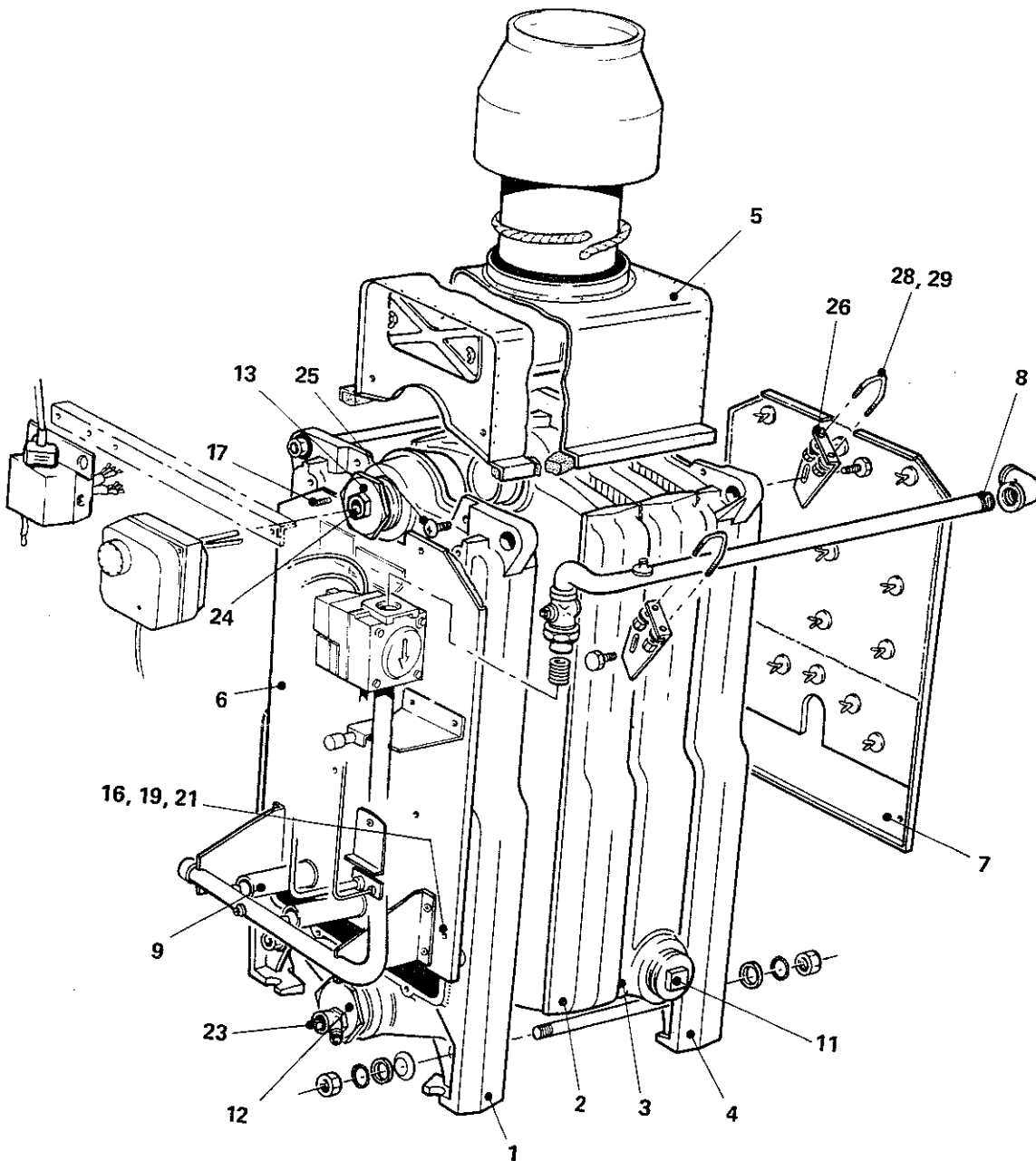
The installation of the boiler must be in accordance with the Gas Safety Regulations; Building Regulations; I. of E.E. Regulations, and the byelaws of the local Water Undertaking. It should also be in accordance with the relevant British Standards and Codes of Practice, together with any relevant requirements of the local Gas Region and Local Authority.

### Tools and Materials required

- Machine Oil
- Pipe Fitting Tools
- Pozidrive Screwdriver
- M5 and M8 Spanners
- Mastic Applicator Gun

#### Note:

All numbered references in illustration are in direct relationship to packing list references.



## PREPARATION OF SECTIONS

Each section should be brushed clean on all external surfaces and any debris which may have accumulated within the sections should be removed via the bottom nipple ports. The nipple ports and nipples should be thoroughly cleaned of protective grease and light oil applied.

## SECTION ASSEMBLY (Refer Fig. 14)

Place the back section in position, supporting it with a wooden prop. Locate nipples in the top and bottom nipple ports and carefully drive them home, using a mallet and a hardwood block. Ensure that the nipples are entered correctly as incorrectly entered nipples will almost certainly lead to leaks and fractures. Try the nipple gauge across the face of each horned nipple, in two positions, at right angles. A correctly entered nipple should provide a parallel gap of up to 2mm (1/16in) under the gauge. (Refer to Fig.12). Cut the nozzle of the Mastic tube(s) supplied to suit bead

diameter of approximately 8mm.

Apply the 'Mastic' supplied into the beading grooves in the front face of the back section, in the position shown by the dotted line in Fig. 13.

Manoeuvre the connector section (with side return tapping) into position, carefully supporting it in a suitable manner until it engages the nipples projecting from the back section. Pass a notched assembly rod through each of the upper and lower nipple ports with the longer threaded ends protruding through the nipple ports to the rear of the boiler. Pass the cast iron assembly washers along the assembly rods (see Fig. 14) ensuring that the locating lugs on the washers are correctly engaged in the nipple ports on the front of the connector section and the rear of the back section, thus centralising the assembly rods. Place an assembly collar on the notched end of each assembly rod and engage the round-nosed setscrews in the appropriate notches.

Fit flat steel washers and nuts on the longer threaded ends

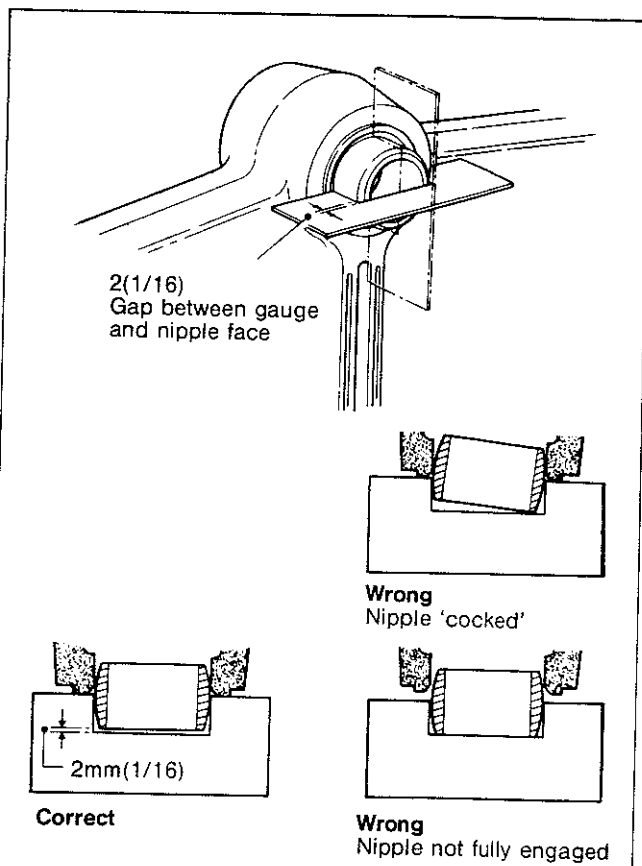


Fig. 12

USE OF NIPPLE GAUGE

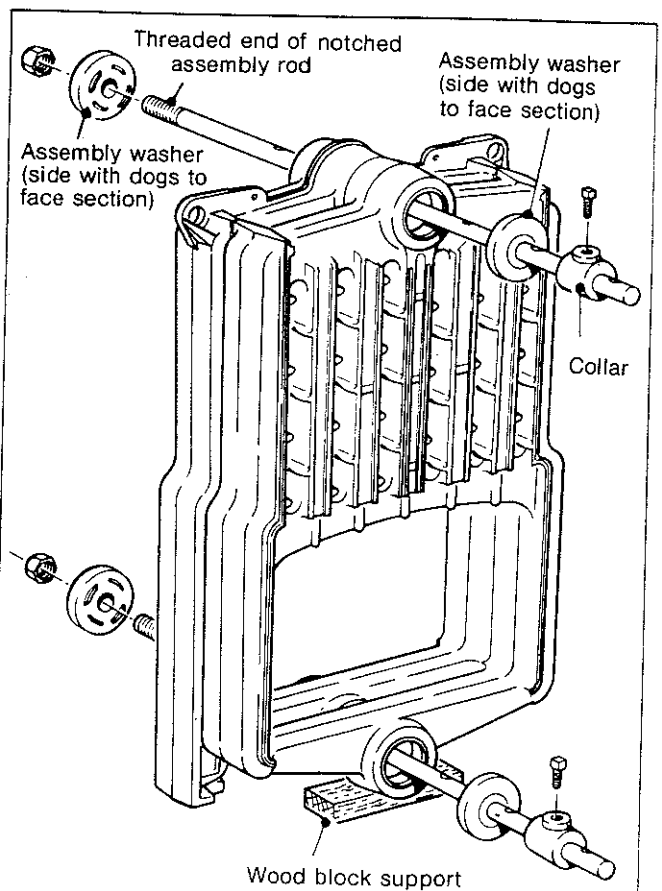


Fig. 14

SECTION ASSEMBLY

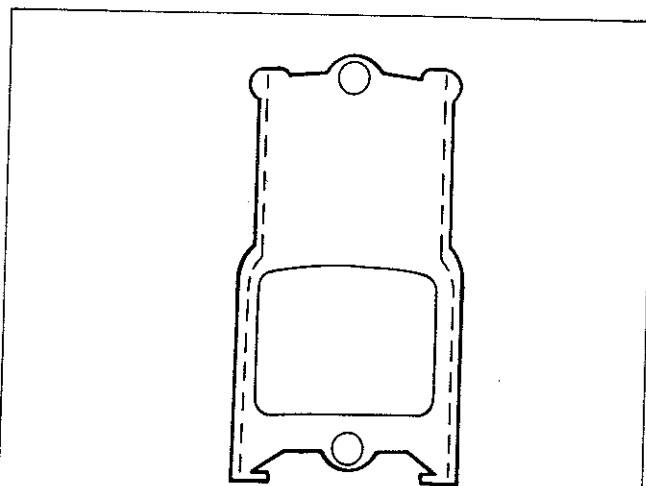


Fig. 13

APPLICATION OF MASTIC SEALING STRIP

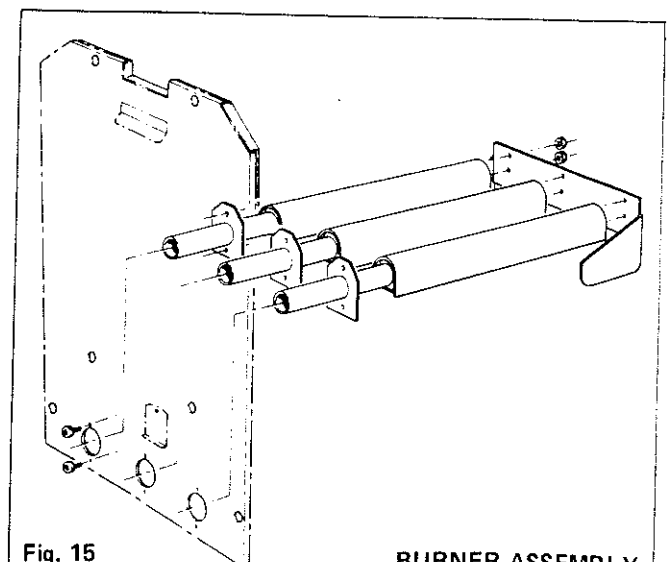


Fig. 15

BURNER ASSEMBLY